opposite sides of the track to generate respective signals, and differential means response to said respective signals to provide a signal dependent on the torque in the shaft.

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13. (Amended) A transducer assembly as claimed in Claim 12 in which said write head is energised with an AC signal at a selected frequency.

Remarks

Please enter this amendment prior to calculating the filing fee. A marked-up version of the claims 1 - 6 as presented in the International Preliminary Examination Report and original claims 7 - 13 in the published PCT application is attached as Exhibit A. Exhibit B is a clean version of the claims.

Respectfully submitted,

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Exhibit A - Marked Claims

1. (As Amended) A torque transducer for measuring torque in a rotating shaft (61) of the kind having a transducer region (64), for example a region storing a permanent magnetisation, in which a magnetic transducer field is established and at least one non-contacting sensor (7; 22; 23) adjacent the transducer region (64) to develop a torque-dependent signal, wherein in operation the shaft (61) is subject to longitudinal flux (60) generated by means (65) external to the transducer region (64), characterised by a non-contacting sensor (97; 21; 24) responsive to a component of said longitudinal flux to develop a signal representing the level of said longitudinal flux, and means (65) responsive to the level-representing signal for said longitudinal flux and magnetically coupled to said shaft (61) to generate a compensating flux to counteract said longitudinal flux at the transducer region (64).

2. (As Amended) A torque transducer as claimed in Claim 1 wherein said means for generating the compensating flux comprises at least one current-carrying coil (L1, L2) about the shaft to be magnetically coupled thereto.

3. (As Amended) A torque transducer as claimed in Claim 1 said means (65) for generating the compensating flux comprises a magnetic structure (70) having poles (72a, 72b) spaced along the shaft (61) and at least one current-carrying coil (L3, L4) wound on said magnetic structure (70).

4. (As Amended) A torque transducer as claimed in Claim 1, 2 or 3 in which said shaft carries a collar structure (20) comprising two axially-spaced portions in the space (25) between which is disposed the sensor (24) responsive to the component of longitudinal flux.

5. (As Amended) A torque transducer for measuring the torque in a rotating shaft (61) which, in operation, has a longitudinal field (60) extending therealong, wherein at least one sensor (25) is placed in non-contacting fashion adjacent a portion of the shaft to sense and provide a signal

dependent on a transverse component of flux arising from the longitudinal flux due to the torque in the shaft (61).

6. A torque transducer as claimed in Claim 5 in which a further non-contacting sensor (24) is mounted to sense the longitudinal flux to provide a reference signal.

7. A torque transducer for a rotating shaft (61) comprising flux generating means (L1, L2) for generating a magnetic flux extending longitudinally in a portion (64) of the shaft, said flux generating means (L1, L2) being magnetically coupled to said shaft at axially spaced locations between which said portion (64) is situated, at least one sensor (25) placed in non-contacting fashion adjacent said portion to provide a signal dependent on a transverse component of flux arising from the longitudinal flux in said portion (64) due to the torque in the shaft (61),

said magnetic flux generating means being operable to generate an alternating magnetic field at a selected frequency, and said at least one sensor signal being processed by frequency selective means (24) operable at said selected frequency to provide a signal representing torque in the shaft (61) derived from said alternating magnetic field.

8. A torque transducer as claimed in claim 7 in which said shaft (61) transmits in operation another longitudinal flux (60), not generated by said flux generating means (L1, L2, L3, L4) said selected frequency enabling the signal dependent on the transverse component of flux to be separated from any signal due to said other longitudinal flux in processing by said frequency selective means (34).

9. A torque transducer as claimed in Claim 8 in which said flux generating means operates in a pulsed mode.

10. A torque transducer element as claimed in Claim 7, 8 or 9 in which said flux generating means comprises a pair of spaced coils (L1, L2) wound about said shaft (61) and between which said portion (64) is situated and means (20) for energising said coils (L1, L2) at the selected frequency.

11. A torque transducer element as claimed in Claim 7, 8 or 9 in which said flux generating means comprises a magnetic structure (70) having a pair of spaced poles (72a, 72b) which magnetically coupled to said shaft (61) and between which said portion (64) is situate, at least one coil (L3, L4) would on said magnetic structure, and means (20) for energising said at least one coil (L3, L4) at the selected frequency.

12. A transducer assembly for measuring, preferably in a non-contacting fashion, torque in a rotating shaft (61), the assembly comprising an erase head (12) for cleaning a zone (16) of the shaft as it rotates, a write head (14) downstream of the erase head (12) in the direction of rotation to write a magnetic track (15) of a given width onto the cleaned zone (16), a pair of read heads (14a, 14b) spaced in an axial direction to respond to the magnetic track (15), said read heads (14a, 14b) being disposed on, toward or adjacent opposite sides of the track (15) to generate respective signals, and differential means response to said respective signals to provide a signal dependent on the torque in the shaft (61).

13. A transducer assembly as claimed in Claim 12 in which said write head (15) is energised with an AC signal at a selected frequency.

Exhibit B - Clean Claims

1.(Amended) A torque transducer for measuring torque in a rotating shaft of the kind having a transducer region, for example a region storing a permanent magnetisation, in which a magnetic transducer field is established and at least one non-contacting sensor adjacent the transducer region to develop a torque-dependent signal, wherein in operation the shaft is subject to longitudinal flux generated by means external to the transducer region, characterised by a non-contacting sensor responsive to a component of said longitudinal flux to develop a signal representing the level of said longitudinal flux, and means responsive to the level-representing signal for said longitudinal flux and magnetically coupled to said shaft to generate a compensating flux to counteract said longitudinal flux at the transducer region.

2.(Amended) A torque transducer as claimed in Claim 1 wherein said means for generating the compensating flux comprises at least one current-carrying coil about the shaft to be magnetically coupled thereto.

3. (Amended) A torque transducer as claimed in Claim 1 said means for generating the compensating flux comprises a magnetic structure having poles spaced along the shaft and at least one current-carrying coil wound on said magnetic structure.

4. (Amended) A torque transducer as claimed in Claim 1 in which said shaft carries a collar structure comprising two axially-spaced portions in the space between which is disposed the sensor responsive to the component of longitudinal flux.

5. (Amended) A torque transducer for measuring the torque in a rotating shaft which, in operation, has a longitudinal field extending therealong, wherein at least one sensor is placed in non-

contacting fashion adjacent a portion of the shaft to sense and provide a signal dependent on a transverse component of flux arising from the longitudinal flux due to the torque in the shaft.

6. (Amended) A torque transducer as claimed in Claim 5 in which a further non-contacting sensor is mounted to sense the longitudinal flux to provide a reference signal.

7. (Amended) A torque transducer for a rotating shaft comprising flux generating means for generating a magnetic flux extending longitudinally in a portion of the shaft, said flux generating means being magnetically coupled to said shaft at axially spaced locations between which said portion is situated, at least one sensor placed in non-contacting fashion adjacent said portion to provide a signal dependent on a transverse component of flux arising from the longitudinal flux in said portion due to the torque in the shaft,

said magnetic flux generating means being operable to generate an alternating magnetic field at a selected frequency, and said at least one sensor signal being processed by frequency selective means operable at said selected frequency to provide a signal representing torque in the shaft derived from said alternating magnetic field.

8. (Amended) A torque transducer as claimed in claim 7 in which said shaft transmits in operation another longitudinal flux, not generated by said flux generating means said selected frequency enabling the signal dependent on the transverse component of flux to be separated from any signal due to said other longitudinal flux in processing by said frequency selective means.

9. A torque transducer as claimed in Claim 8 in which said flux generating means operates in a pulsed mode.

10. (Amended) A torque transducer element as claimed in Claim 7 in which said flux generating means comprises a pair of spaced coils wound about said shaft and between which said portion is situated and means for energising said coils at the selected frequency.

11.(Amended) A torque transducer element as claimed in Claim 7 in which said flux generating means comprises a magnetic structure having a pair of spaced poles which magnetically coupled to said shaft and between which said portion is situate, at least one coil would on said magnetic structure, and means for energising said at least one coil at the selected frequency.

12. (Amended) A transducer assembly for measuring, preferably in a non-contacting fashion, torque in a rotating shaft, the assembly comprising an erase head for cleaning a zone of the shaft as it rotates, a write head downstream of the erase head in the direction of rotation to write a magnetic track of a given width onto the cleaned zone, a pair of read heads spaced in an axial direction to respond to the magnetic track, said read heads being disposed on, toward or adjacent opposite sides of the track to generate respective signals, and differential means response to said respective signals to provide a signal dependent on the torque in the shaft.

13. (Amended) A transducer assembly as claimed in Claim 12 in which said write head is energised with an AC signal at a selected frequency.

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